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EXAMINER

HUYNH, YENNHU B

ART UNIT PAPER NUMBER

2813

DATE MAILED: 01/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/810,595

Applicant(s)

COURSEY, BELFORD T.

Examiner

Yennhu B Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30, 32-37 and 48-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30, 32-37 and 48-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8 & 22 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/15/03 has been entered.

Currently, claims 26-30, 32-37 & 48-58.

Information Disclosure Statement

The information disclosure statement filed on 6/11/02 (including Fuji et al. reference) and 12/15/02 are being considered by the examiner.

Oath/Declaration

Oath/Declaration filed on 3/15/01 is accepted.

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is

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requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country, in public use, or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 26, 27, 36 & 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Jeng et al. (U.S. 5,780,338).

Jeng et al. at figs. 1-7 in related text cols. 1-12 discloses a method for manufacturing crown shaped stacked capacitors on DRAM integrated circuits, which include:

-Re. claims 26, 27, 36 & 56: a semiconductor substrate 10; a plurality of word lines 20 received over the semiconductor substrate; an insulative layer 40 over the word lines and the substrate; the insulative layer having at least one well 8 (fig.4) formed therein, the well comprising a base received over the word lines, wherein the base is substantially planar (fig.4); the well peripherally defining an outline of a memory array area, area peripheral to the well comprising memory peripheral circuitry area (fig.4, col. 4, lines 26-28); a plurality of memory cell storage capacitors 48 received within the at least one well over the word lines (col.6); peripheral circuitry within the peripheral circuitry area operatively configured to write and read from the memory array (col.1,

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lines 34-43); the insulative layer has a substantially planar outermost surface and the capacitors have capacitor storage node electrodes (located at node contact opening 9, fig.6) having topmost surfaces received elevationally proximate the substantially planar outermost surface of the insulative layer (fig.6 col.7 lines 55-58 and col. 8 lines 49-64).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al. (U.S. 5,780,338) in view of Hieda et al. (U.S. 5,138,412).

Jeng et al. at figs. 1-7 in related text cols. 1-12 discloses a method for manufacturing crown shaped stacked capacitors on DRAM integrated circuits, which include:

-Re. claim 33: an insulative layer 40 over the word lines and the substrate; the insulative layer having at least one well 8 (fig.4) formed therein; the well peripherally defining an outline of a memory array area, area peripheral to the well comprising memory peripheral circuitry area (fig.4, col. 4, lines 26-28); a plurality of memory cell storage capacitors 48 received within the at least one well (col.6); the memory cell capacitors comprising a storage node electrodes container (located at node contact

opening 9, fig.6), and the peripheral circuitry within the peripheral circuitry area operatively configured to write to and read from the memory array (col.1, lines 33-47).

However, Jeng et al. do not disclose an oxygen diffusion barrier layer received over the well base, wherein the storage capacitor node container is received through the oxygen diffusion barrier layer and through the well base.

Hieda et al. in related art disclose a DRAM device which include an silicon oxide layer 11b functions as of an etch stop/diffusion barrier layer, and subject to etching for forming storage node capacitor, received over the well base, wherein the storage capacitor node container is received through the oxide/etch stop/ diffusion barrier layer and through the well base (fig. 8 col. 7 lines 40-56).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Jeng et al. invention by incorporation the silicon oxide layer functions as of a diffusion barrier layer, to protect the under layer during etching process in forming the storage node capacitor.

Claims 28-30,34 & 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al. (U.S. 5,780,338)

Jeng et al. disclose wherein the word lines have insulative caps 24 (fig.6), buried digit line 32 (fig.2), but do not disclose wherein the well base has a lowest portion which is received at least 2000 Angstroms above the caps (cls. 28 & 34); and is received at least 1000 Angstroms above the outermost tops of the digit lines (cls. 29, 30 & 35).

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-Re. claims 28-30,34 & 35: the specified location of the elements is not patentably distinguishable over the art of record. Since it has been held, that such placement would have involved routine experimentation in the art. As noted *In re Aller* 105 USPQ233, 255 (CCPA 1955), the selection of temperature and concentration would have been obvious.

"Normally, it is to expected that a change in temperature, or in range, concentration, cycles, thickness or dimension would be an unpatentable modification. Under some circumstance, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality ... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Claims 32,37 & 48-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al. (U.S. 5,780,338) in view of Lane et al. (U.S. 5,998,257).

Jung et al. disclose substantially all of claimed features, but do not disclose wherein the insulative layer comprises SiO₂ or Si₃N₄ (cl.48); and the height dimension constitutes a location which is remote on the substrate between the well base and tops of digit lines of word lines (cls. 32,37 & 48-53).

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-Re. claim 48-53: It is well known to one having skilled in the art to have claimed for making the insulating layer includes SiO₂ or Si₃N₄ material, because it is a conventional insulative material (Nishikawa et al., US. 6,087,261).

With respect to claims 32, 37 & 48-53, the specified location of the elements is not patentably distinguishable over the art of record. Since it has been held, that such placement would have involved routine experimentation in the art. As noted *In re Aller* 105 USPQ233, 255 (CCPA 1955), the selection of temperature and concentration would have been obvious.

"Normally, it is to expected that a change in temperature, or in range, concentration, cycles, thickness or dimension would be an unpatentable modification. Under some circumstance, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality ... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmscher* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Allowable Subject Matter

Claims 54,55,57 & 58 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: The prior art does not disclose wherein individual of the capacitors have a storage node electrode,

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one of the storage node electrodes/or storage node containers being spaced laterally inward of the outline peripherally defined by the well thereby forming a space between the one electrode and the outline (cls. 54 & 55); wherein the insulative layer is formed to have a substantially planar outer most surface, the memory cell storage capacitors respectively comprising an outer cell electrode having a topmost surface which is received elevationally outward of the insulative layer (cls. 57 & 58).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B Huynh whose telephone number is 703-308-6110 (and the new telephone number 571-272-1692 will be effected from 2/5/04). The examiner can normally be reached on 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-7724,

Yennhu Huynh

Examiner

1/13/04